A1250-1

SEPTEMBER 2, 1985

CHEMICAL & ENGINEERING

NEWS

C5111 79C095 9 1
AR6335SL
INFO SERV-SRI
CONGRESSIONAL WEST HWY SUITE 800
4520 EAST
SRI ACQUISITIONS
BETHESDA MD 20814

Early Retirement

Incentives again popular in chemical firms

Page 9

CHEMICAL & ENGINEERING
NEWS
Volume 63, Number 35
CENEAR 63 (35) 1–44
ISSN 0009-2347
SEPTEMBER 2, 1985

News of the Week

■ **Union Carbide plans drastic restructuring to rectify some of its problems, gives lengthy explanation of recent Institute leak.** **Page 6**

■ **Richard Heckert takes new post at Du Pont, is slated to fill Edward Jefferson's position as chairman of the board.** **Page 7**

■ **Proposed duties on some imports would save chemical jobs, but do more harm than good to overall U.S. economy.** **Page 8**

■ **Herbicide-resistant corn varieties are close to marketing stage.** **Page 8**

Business

EPA expected to modify Du Pont waiver for methanol fuel blends, easing up on highly restrictive volatility requirements. **Page 14**

Government

Congressional report on drug diversion schemes reveals growing threat to safe drug supply. **Page 17**

Environmental group links rain sulfates in West to sulfur dioxide emissions from copper smelters. **Page 18**

Technology

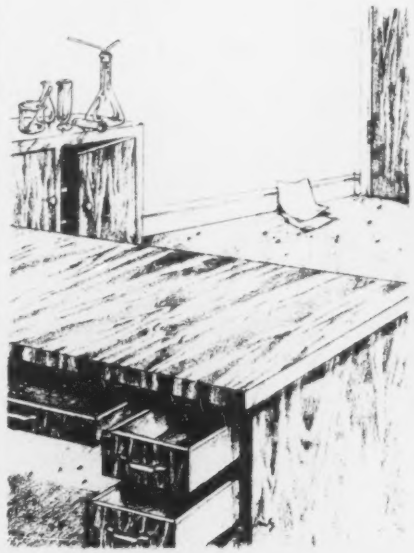
First experiment in space attempting to grow organic crystals by vapor transport placed aboard *Discovery* by 3M Co. **Page 22**

Education

Academic labs' problems of obsolete equipment may find relief from a number of actions recommended by study. **Page 23**

ACS News

Role of dues in ACS finances explained by the Society Committee on Budget & Finance. **Page 26**



News Focus

Incentives for early retirement have been accepted by employees in the chemical industry with growing success, though other businesses find trend toward such incentives to be slowing. **Page 9**

Letters 4
Editor's Page 5

Concentrates
Business 13
Government 16
Science/Technology 20

The Departments
Meetings 28
Newscripts 44

CARBIDE RESTRUCTURES: Problems prompt massive cutback

In a dramatic attempt to rectify some of its problems, Union Carbide has announced it will shut down some of its chemical plants, sell others, and cut its salaried workforce by 4000. The consolidation, which will result in a pretax charge of about $990 million, will subtract about $8.00 per share from this year's earnings. Analysts generally praised the plan, calling it overdue but likely to aid the company's financial performance in the future.

The move comes on the heels of the firm's explanation of—and acceptance of responsibility for—the chemical leak last month at its Institute, W.Va., facility.

Focusing on its most troubled business segments, Carbide will write off $325 million worth of petrochemical assets, $370 million of metals and carbon products assets, and $170 million worth of other assets. The company, which already has sold several units this year, will divest another $500 million worth of business deemed nonstrategic. The identities of the units to be closed or sold have not been disclosed.

To reduce payroll, Carbide will offer early retirement incentives aimed at decreasing its salaried staff by 4000, or 15%, by early next year. The reduction, much of which probably will take place in Carbide's Danbury, Conn., headquarters, will result in a $70 million pretax charge to 1985 earnings. After the reduction in force is completed, however, annual pretax savings will amount to about $250 million, the company says.

Carbide also is taking steps to increase shareholder value. It will begin buying back up to 10 million shares of common stock (which closed last Wednesday at $55 3/8) and will launch a debt reduction program. In addition, the company will alter its domestic pension plan to allow it to appropriate $500 million in surplus funds, money that probably will be used to finance the stock repurchase program.

Carbide is committing $220 million in total to a program to improve environmental protection and safety in the company. The remaining element in the decisions announced last week involves changes in depreciation policies.

Anderson: committed to safety

Announcement of the massive restructuring comes a month after a major reorganization that consolidated Carbide's five business groups into two (C&EN, Aug. 5, page 6). Both the management consolidation and the restructuring begun last week emphasize Carbide's interests in its industrial gases, consumer, and technology licensing businesses.

"The program being announced, together with the recent reorganization and the upgrading of our business portfolio, is evidence of our continuing commitment to achieving competitive leadership and to increasing shareholder return while committing to a goal of environmental protection and safety in all our operations," says Warren M. Anderson, Carbide's chief executive officer.

The announcement comes in the midst of takeover rumors, the continuing controversy over the gas leak disaster at a company subsid-

Decomposition products and solvent expelled from vessel

Compound	Amount released, lb
Methylene chloride	650
Methyl isopropyl sulfide	550
Isobutyronitrile	500
Aldicarb nitrile[a]	400
Dimethyl disulfide	300
Methyl mercaptan	275
Aldicarb amide[b]	250
Trimethyl isocyanurate	150
Isobutyramide	125
Acetone	95
Volatile polymers	90
Acetoxime	90
1,3,5-Trimethylbiuret	75
1,3-Dimethylurea	75
Dimethyl sulfide	70
2,4-Dithiapentane	65
2-Methylthiopropene	40
Isobutylene	9
Aldicarb aldehyde[c]	9
Isopropyl chloride	9
Aldicarb oxime[d]	8
Hydrogen sulfide	8
Propylene	7

a α-Methylthioisobutyronitrile. b α-Methylthioisobutyramide. c α-Methylthioisobutyraldehyde. d α-Methylthioisobutyraldoxime. Source: Union Carbide

iary in Bhopal, India, and recent chemical leaks at Carbide's Institute plant. At a press conference, the firm revealed the results of the investigation of the eruption on Aug. 11 of a reactor being used as a storage vessel at the Institute plant. Carbide chemists and engineers have concluded that an exothermic decomposition of aldicarb oxime was the most likely cause of the eruption. Of the 3800 lb of material expelled, 650 lb was methylene chloride solvent, 300 lb was solid residue in pipes from previous use of the reactor, and only 8 lb was aldicarb oxime itself.

Some of the compounds released were foul smelling as well as toxic. Jackson B. Browning, vice president of health, safety, and environmental affairs, says that such compounds as methyl mercaptan and dimethyl sulfide and disulfide persisted in the community at concentrations from 3 to 18 ppm for a half hour. Compounds related to aldicarb oxime reached concentrations of 10 ppm. Methylene chloride vapor extended beyond the fence limit at 22 ppm for a few minutes, Browning says.

As Carbide investigators reconstruct the incident, methylene chloride was piped into the aldicarb reactor on Aug. 1. Aldicarb oxime (α-thiomethylisobutyraldoxime) was introduced next. A malfunction in a flow meter caused too much oxime to be let in. Engineers installed a temporary pipeline to pump the solution into another 5000-gal, glass-lined reactor that had not been used since November 1984.

Unknown to Carbide operators, steam flowed through leaky valves into the jacket of this reactor from Aug. 1 to 7. The heat caused methylene chloride (boiling point 104 °F) to boil off from the oxime (boiling point 410 °F), raising the concentration of oxime from 38% to 81%. Methylene chloride was later found to have condensed in two connected vessels called the knockout pot and the crystallizer.

Not realizing that this change had occurred, Carbide operators tried to pump the reactor contents back into the aldicarb reactor on Aug. 7. After two and a half hours, the pump appeared not to be moving any more material, and it was shut off. Operators could not use level indicators to determine that the pumping was incomplete because the remaining 500 gal formed what is called a heel in the convex bottom of the vessel.

Steam continued to flow into the reactor jacket, and the temperature rose. To know that this was happening, operators would have had to call up the display of the reactor's condition on the control-room computer. Thinking the reactor empty, they did not do this.

From laboratory experiments and computer simulations, Carbide investigators conclude that on the morning of Aug. 11, the reactor temperature reached 300 °F. This temperature initiated exothermic decomposition of the oxime. At 9:25 AM, a differential pressure alarm went off, indicating that a safety valve had burst and that a high flow of gas was flowing through the knockout pot and scrubber to the flare tower. An operator entering the control room heard a rumbling sound from the reactor. He looked toward the flare tower and saw a lot of smoke. After four seconds, the differential pressure indicator dropped precipitously, indicating that other release valves had opened. The plant alarm was sounded at 9:26.

An opaque, white fume engulfed the yard and the control room, trapping five operators and their foreman. The men could not see the panels in front of them. At 9:32, the eruption ended. A minute later, the workers were led to safety. At 9:36 county officials were notified.

The reactor that erupted had last been used in November 1984 to react 2,4,6-trimethylphenol with methyl isocyanate. Methyl isocyanate was not involved in the incident of Aug. 11. There remained in the piping associated with the reactor a residue of such methyl isocyanate derivatives as 1,3-dimethylurea, 1,3,5-trimethylbiuret, and trimethyl isocyanurate. These solids (300 lb) were blown out along with aldicarb oxime decomposition products and methylene chloride. □

Heckert chosen to be next Du Pont chief

Du Pont has appointed current vice chairman Richard E. Heckert to a new post of deputy chairman of the board. The move positions Heckert to succeed chairman and chief executive officer Edward G. Jefferson when Jefferson retires next May 5. As deputy chairman, Heckert, 61, has operating responsibility for all Du Pont units and consolidated subsidiaries.

Succeeding Heckert as vice chairman is Edgar S. Woolard Jr., 51, who becomes responsible for Du Pont operations excluding Conoco.

Jefferson, who has been chairman and chief executive officer since 1981, says that "by announcing the appointments at this time, we pave the way for an orderly management transition at a time of important changes to improve the competitive position of our businesses." Besides the acquisition of Conoco, Du Pont in the past several years has been diversifying itself away from traditional chemicals and becoming more heavily involved in specialty chemical, biomedical, and electronics businesses.

Heckert, who joined Du Pont as a research chemist in 1949, has been a director and member of the executive committee since 1973. In 1981, when Jefferson became chairman of Du Pont, Heckert was made president and chief operating officer of

C&EN staff photo

Heckert: appointed to new post